BROOKHAVEN NATIONAL LABORATORY

Work Permit # _____
Work Order # _____
Job# _____ **Activity#** _____

1. Work requester fills out this section. ☐ **Standing Work Permit**

Requester: Don Lynch	Date: 09/12/05	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): S. Marino			Ext.: 3704
Work Control Coordinator: Don Lynch		Start Date: 09/13/05	Est. End Date: 09/30/05
Brief Description of Work: Repair and/or replace failed FEE electronics in South Muon Magnet Sector 3 Octant 3			
Building: 1008	Room: IR	Equipment: n/a	Service Provider: PHENIX

. WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

ES&H ANALYSIS				
Radiation Concerns	☒ None	☐ Activation	☐ Airborne	☐ Contamination	☐ Radiation
Radiation Generating Devices:	☐ Radiography	☐ Moisture Density Gauges	☐ Soil Density Gauges	☐ X-ray Equipment
☐ Special nuclear materials involved, notify Isotope Special Materials Group			☐ Fissionable materials involved, notify Laboratory Criticality Officer	
Safety Concerns	☐ None	☐ Ergonomics	☐ Transport of Haz/Rad Material	
☐ Adding/Removing Walls or Roofs	☐ Confined Space*	☐ Explosives	☐ Lead*	☐ Penetrating Fire Walls
	☐ Corrosive	☐ Flammable	☐ Magnetic Field*	☐ Pressurized Systems
☐ Asbestos*	☐ Cryogenic	☐ Fumes/Mist/Dust*	☐ Material Handling	☐ Rigging/Critical Lift
☐ Beryllium*	☐ Electrical	☐ Heat/Cold Stress	☐ Noise*	☐ Toxic Materials*
☐ Biohazard*	☒ Elevated Work*	☐ Hydraulic	☐ Non-ionizing Radiation*	☐ Vacuum
☐ Chemicals*	☐ Excavation	☐ Lasers*	☐ Oxygen Deficiency*	☐ Other
* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? ☐ Yes ☒ No				
Environmental Concerns		☒ None	☐ Work impacts Environmental Permit No.	
☐ Atmospheric Discharges (rad/non-rad)		☐ Land Use	☐ Soil Activation/contamination	☐ Waste-Mixed
☐ Chemical or Rad Material Storage or Use		☐ Liquid Discharges	☐ Waste-Clean	☐ Waste-Radioactive
☐ Cesspools (UIC)		☐ Oil/PCB Management	☐ Waste-Hazardous	☐ Waste-Regulated Medical
☐ High water/power consumption		☐ Spill potential	☐ Waste-Industrial	☐ Underground Duct/Piping
Waste disposition by:				☐ Other
Pollution Prevention (P2)/Waste Minimization Opportunity:		☒ None ☐ Yes		
FACILITY CONCERNS	☒ None			
☐ Access/Egress Limitations	☐ Electrical Noise	☐ Potential to Cause a False Alarm		☐ Vibrations
	☐ Impacts Facility Use Agreement		☐ Temperature Change	☐ Other
☐ Configuration Control	☐ Maintenance Work on Ventilation Systems		☐ Utility Interruptions	
WORK CONTROLS				
Work Practices				
☐ None	☐ Exhaust Ventilation	☒ Lockout/Tagout	☐ Spill Containment	☐ Security (see Instruction Sheet)
☒ Back-up Person/Watch	☐ HP Coverage	☐ Posting/Warning Signs	☐ Time Limitation	☐ Other
☐ Barricades	☐ IH Survey	☐ Scaffolding-requires inspection	☐ Warning Alarm (i.e. "high level")	
Protective Equipment				
☐ None	☐ Ear Plugs	☐ Gloves	☐ Lab Coat	☐ Safety Glasses
☐ Coveralls	☐ Ear Muffs	☐ Goggles	☐ Respirator	☒ Safety Harness
☐ Disposable Clothing	☐ Face Shield	☐ Hard Hat	☐ Shoe Covers	☒ Safety Shoes ☐ Other
Permits Required (Permits must be valid when job is scheduled.)				
☒ None	☐ Cutting/Welding	☐ Impair Fire Protection Systems		
☐ Concrete/Masonry Penetration	☐ Digging/Core Drilling	☐ Rad Work Permit-RWP No		
☐ Confined Space Entry	☐ Electrical Working Hot	☐ Other		
Dosimetry/Monitoring				
☒ None	☐ Heat Stress Monitor	☐ Real Time Monitor	☐ TLD	
☐ Air Effluent	☐ Noise Survey/Dosimeter	☐ Self-reading Pencil Dosimeter	☐ Waste Characterization	
☐ Ground Water	☐ O_2/Combustible Gas	☐ Self-reading Digital Dosimeter	☐ Other	
☐ Liquid Effluent	☐ Passive Vapor Monitor	☐ Sorbent Tube/Filter Pump		
Training Requirements (List below specific training requirements)				
PHENIX Awareness, LOTO affected, RHIC Access, working at heights,				
Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:			**If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)**	
ES&H Risk Level:	☐ Low	☒ Moderate ☐ High	WCC:	Date:
Complexity Level:	☐ Low	☒ Moderate ☐ High	Service Provider:	Date:
Work Coordination:	☐ Low	☒ Moderate ☐ High	Authorization to start	Date:
			(Departmental Sup/WCC/Designee)	

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, and personnel availability need to be addressed): See attached procedure.
Special Working Conditions Required: No
Operational Limits Imposed: No
Post Work Testing Required:

Job Safety Analysis Required: ☐ Yes ☒ No	Walkdown Required: ☒ Yes ☐ No

Reviewed by: Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.

Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator	Don Lynch		20146	9/12/2005
Service Provider				
	Review Done: ☐ in series	☐ team		

4. Job site personnel fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Departmental Job Supervisor, Work Control Coordinator/Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required. ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

7. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)
a) WCM/WCC: Is any feedback required? ☐ Yes ☐ No

b) Workers: Are there better methods or safer ways to perform this job in the future? ☐ Yes ☐ No

8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)

Name:	Signature:	Life#:	Date:
Comments:			

Work plan Attachment **WP# _____**

Repair and/or replace Station 3 Octant 3 FEM's inside South Muon Magnet in PHENIX IR, Bldg. 1008

Discussion

The Front End Electronics boards (FEE) for the Muon Tracker Detectors (MuTr) are located in various areas inside the North (MMN) and South Muon Magnets (MMN) in the PHENIX IR. The specific electronics to be repaired under this work plan are located under the top steel shield ("lampshade") in the MMS. These electronics are contained in printed circuit cards in metal boxes attached to the internal support structure for the MMS. These cards cannot be accessed from inside the MMS because of their location (height) and the lack of internal access provisions. The addition of the new Central Magnet ("bridge") platform in the PHENIX IR and its proximity to the "eyebrow" platform above the MMS now allows for a short platform to be suspended from the deck structure of these 2 rack platforms thus allowing access to the electronics requiring repair/replacement.

This work is to be done by fully trained and experienced PHENIX personnel, under the supervision of Sal Marino. The platform is an existing purchased work platform manufactured by Werner, Inc. rated for 500 lbs. This platform will not be modified in any way and will be supported by 2 steel hangers. Access to the Werner platform will be provided via a 6 ft A-frame ladder on the Werner platform secured to the bridge platform. (See attached sketch)

After the platform and hangers are installed, the actual repairs will be performed by PHENIX MuTr experts with assistance from PHENIX mechanical and electrical technicians as necessary. All persons involved will have appropriate training for working at heights, fall protection and all other relevant training.

Procedure

LOTO the power to the MMS magnet coil at the power supply in1008B. (Pearson)

Verify that no gas is flowing to the chambers. (Biggs)

Remove the top lampshade from the MMS (Pearson)

Position the MMS and CM so that the platforms are separated by 29 inches horizontally, then assure that both the MMS and the CM are locked in position by locking out the hydraulics to each magnet mover. (Marino)

Place the Werner platform onto the hangers and position it such that the 2 hangers are equidistant from the center of the platform and over existing holes in platform I-

beams as close to the end of the platform as possible. Match drill the steel hangers for ¼-20 threaded rod, then attach the hangers to the platform with 1/4 -20 threaded rod running through these holes under the platform and through both uprights of the steel hanger. Install speed rails on the North side in the brackets provided on the Werner platform, with 2 horizontal bars equally spaced to achieve less than 24" separation for any horizontal space and secure with locking screws. Attach the steel straps to the 8 foot long channels using bolts as shown in the sketch to assure that the vertical load is transferred from the straps to a point above the toe plates on the channels. Attach horizontal spreader bars to the straps perpendicular to the long edge of the platform at a height just below the bridge toe plate. (Marino)

Using the IR crane, carefully lift the platform/hanger assembly above the gap between the CM and the MMS platforms. Hook the straps over the platform so that the 6 inch channels sit firmly on the eyebrow and bridge decking as appropriate. Secure the bridge side channel to the decking by clamping at 2 points to the Bridge frame. (Marino)

Once the platform is in place the crane hook shall be positioned directly above the mid point of the platform (for personnel tie-off fall protection) then locked out. (Marino/Pearson)

Position the ladder mid way on the Werner platform and attach at the top by unistrut I-beam clamps to the Bridge toe plate.

The MuTr experts and technician assistants must use fall protection harnesses with retractable lanyards at all times when installing, accessing and/or working on the Werner plaform. The harnesses shall be secured to the crane hook. (MuTr experts, PHENIX technicians)

At this point the platform should be checked for rigidity. Use unistrut clamps to secure the Werner platform to the adjacent MMS superstructure. (Marino)

After the platform is installed but before any work is attempted from the platform, it must be inspected by a CA safety representative.

No more than 2 properly trained persons may work on the Werner platform at the same time, and no less than 2 properly trained persons may be present (watch person) when anyone is working by himself (herself) on the Werner Platform.

CAUTION Remove all unnecessary objects from pockets before performing any work on the platform to prevent accidental dropping of objects. All tools shall be secured before accessing the work platform.

When removing electronic cards from their enclosures, extreme caution shall be maintained to prevent any accidental loss of hardware into the MMS.

After repairs are completed the Electronics boxes shall be closed and the Werner platform removed in the reverse sequence indicated above.

After the platform is removed the top lampshade shall be reinstalled as soon as possible.

Analyses:

The platform will be prevented from swinging by the rigidity of the ¼ steel U bracket which attaches the platform to the eyebrow and bridge.

The platform is rated for 500lbs.

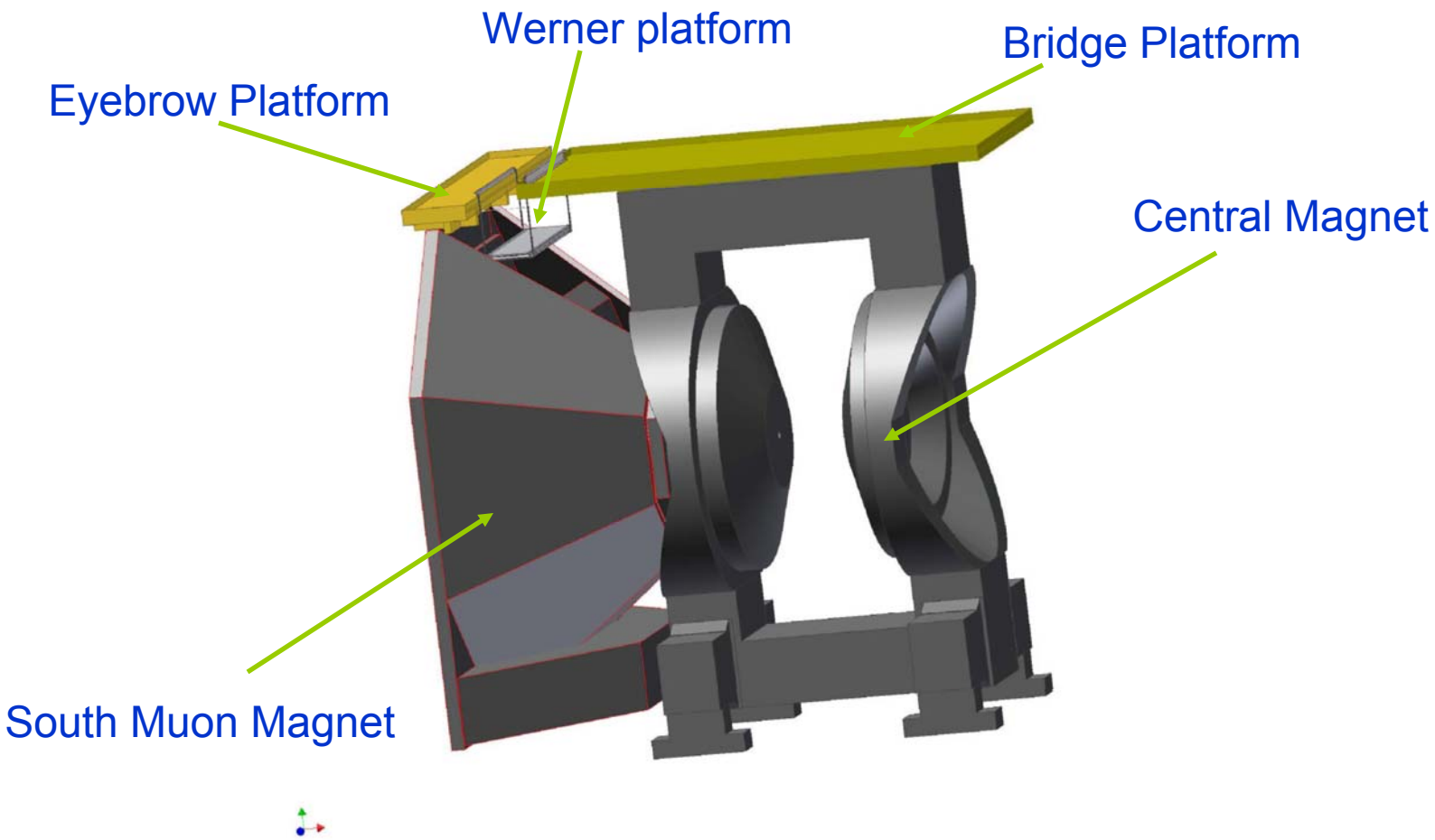
The steel u-brackets have a combined cross section of 2.00 in^2. Taking the most conservative assumption that all of the load is concentrated on 1 of the 4 bracket arms, the cross section area is 0.5in^2 and the maximum stress is

500/.5 = 1000 psi

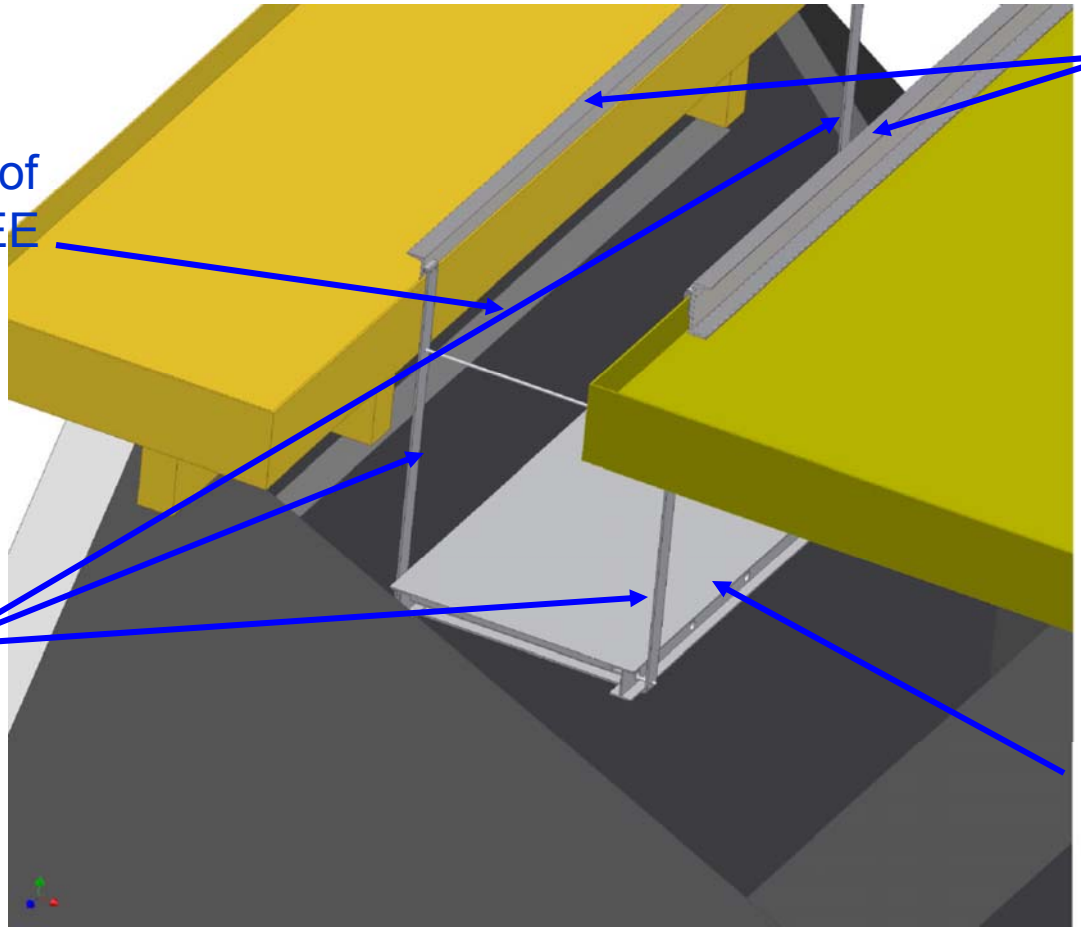
With a yield stress for cold rolled carbon steel of at least 30,000 psi, the safety factor for the brackets is at least 30.

All other load bearing members are pre-rated for loads well in excess of the requirements for this effort.

MuTr Octant 3 Sector 3 Access Platform

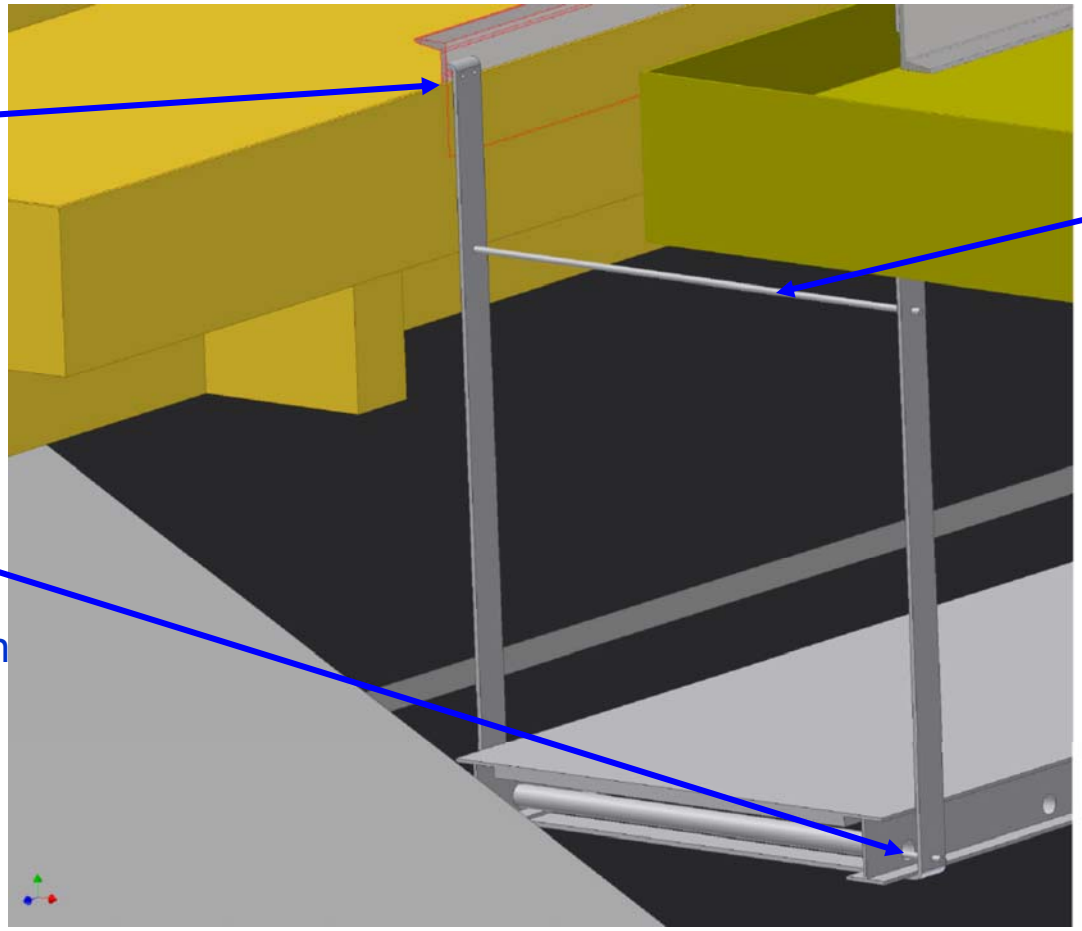


MuTr Octant 3 Sector 3 Access Platform



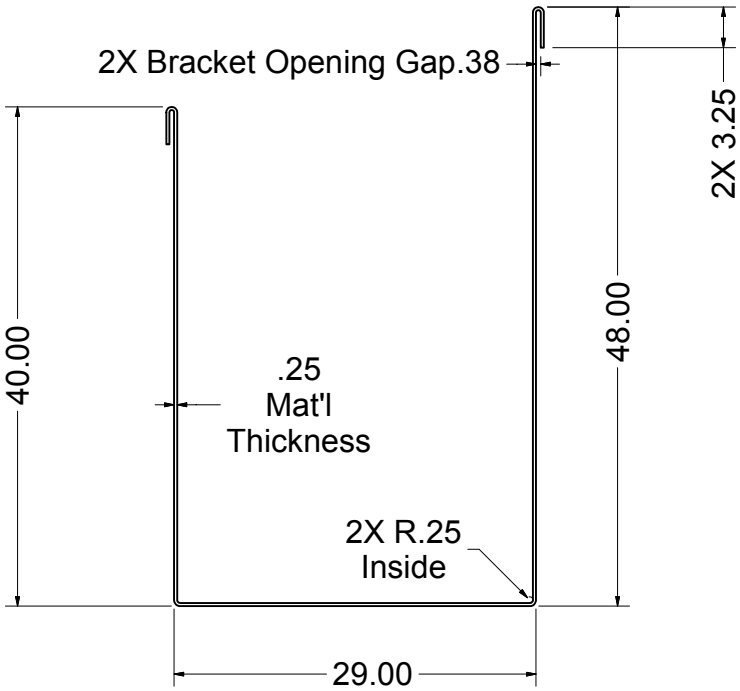
MuTr Octant 3 Sector 3 Access Platform

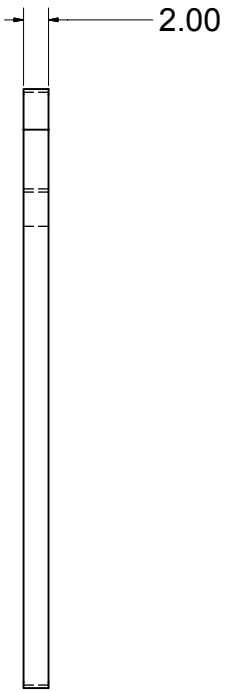
Straps are attached to Channel with bolts above the toe plate to transfer the load to the channels

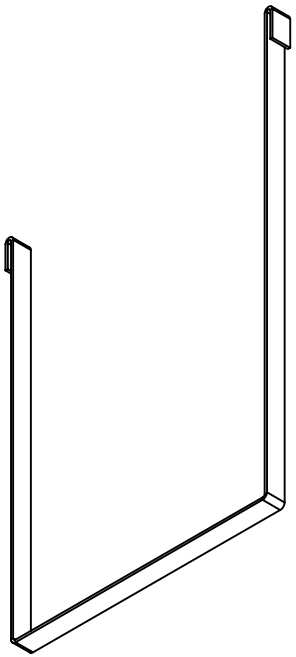


Steel straps trap platform through existing holes in platform with threaded rod.

Threaded rod attached to steel straps at either end of platform to stiffen against swaying and form barriers against travelling beyond the straps at either end







Material: .25 th by 2.00 wide CR Steel

DRAWN Don Lynch	8/24/2005		
CHECKED		TITLE MMS Platform Bracket	
QA			
MFG			
APPROVED		SIZE C	DWG NO MMSPlatform U Channel REV
		SCALE	SHEET 1 OF 1